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F. W. GESS

CONTRIBUTION TO THE KNOWLEDGE OF THE SOUTH AFRICAN SPECIES OF THE GENUS *CERAMIUS* LATREILLE (HYMENOPTERA: MASARIDAE)

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CONTRIBUTION TO THE KNOWLEDGE OF THE SOUTH AFRICAN SPECIES OF THE GENUS *CERAMIUS* LATREILLE (HYMENOPTERA: MASARIDAE)

By

F. W. Gess

South African Museum, Cape Town

(With 1 map)

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Introduction

While arranging the Masaridae in the collection of the South African Museum according to the recent revision of the family by Richards (1962), it was found that this material, which was unfortunately not seen by Richards, supplemented his account in several instances, especially in the genus *Ceramius* Latreille.

In the present paper, dealing with the above genus, the hitherto unknown ♀ of *clypeatus* Richards and ♂ of *metanotalis* Richards are described; the ♂ assigned by Richards to *peringueyi* Brauns is removed from that species and together with a matching ♀ is described as a new species, *richardsi*, and lastly, *rex* de Saussure is resurrected. The locality records of all the specimens in the collection are given in the hope that these may aid in presenting a more complete picture of the distribution of the various South African species. Finally the distribution of the genus as a whole is discussed in the light of the biology of these wasps.

The sequence of species followed is nearly the same as that adopted by Richards, and this paper closely follows the presentation set by the latter in his revision. South African Museum is here abbreviated to S.A.M.

Descriptions of Species and Distribution Records

Ceramius cerceriformis de Saussure

Ceramius cerceriformis de Saussure, 1853: xxi, ♂; Richards, 1962: 97, ♂, ♀.
Ceramius (Ceramioides) cerceriformis de Saussure, 1854: pl. 4, fig. 1, ♂; 1855: 72, ♂.
Cerceris vespiformis de Saussure, 1855: 79, ♀.

Ann. S. Afr. Mus. **48** (11), 1965: 219–231, 1 map.

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No specimens were found in the South African Museum collection that could be assigned to this species.

Ceramius schulthessi Brauns

Ceramius schulthessi Brauns, 1902: 182, ♀; Brauns, 1913: 196, pl. 2, fig. 6, ♂, ♀; Richards, 1962: 99.

Specimens examined: Cape Province: Willowmore, no date, 3♀♀ (one marked as co-type), 1. xii. 1904, ♀, xi. 1917, 2 ♀♀ (Dr. Brauns); Augusfontein, Calvinia, ix. 1947, 3 ♀♀ (S.A.M. Staff); Oudtshoorn, Zebra, x. 1951, 3 ♀♀ (S.A.M. Staff); Touws River—Hondewater (18 miles E. of Touws River), xii. 1962, ♀ (S.A.M. Staff); Bloutoring Station (30 miles E. of Touws River), xii. 1962, 4 ♀♀ (S.A.M. Staff).

Namaqualand: Between Kamieskroon and Springbok, x. 1939, 4 ♂♂ 4 ♀♀ (S.A.M. Staff); Wallekraal, x. 1950, ♀ (S.A.M. Staff).

Ceramius peringueyi Brauns

Ceramius peringueyi Brauns, 1913: 194, ♀; Richards, 1962: 100 [♀ only].
[*non*] *Ceramius peringueyi* Brauns, Richards, 1962: 100, ♂ [= *richardsi* sp. n.].

Specimens examined: Cape Province: Stellenbosch, x. 1888, holotype ♀ (L. Peringuey) (Transvaal Museum); Het Kruis, x. 1947, 3 ♀♀ (S.A.M. Staff); Paleisheuwel, xi. 1948, ♀ (S.A.M. Staff).

Ceramius clypeatus Richards

Ceramius clypeatus Richards, 1962: 99, ♂.

♀. Black; raised disk of clypeus to a variable degree, inner orbits at deepest portions of ocular sinus, spot of variable size on tempora, usually a small spot on prepectus, variably sized spot at apex of scutellum, rarely a minute spot on propodeal spine, occasionally a short basal streak along outer side of fore tibiae and rarely indicated basal spots on outer side of mid and hind tibiae, spots at sides of gastral tergites 1–4 and usually also on 5, sometimes produced inwards on 2–5 either forming narrow continuous or interrupted bands, *creamy-white to yellowish.*

Underside of antennal joints 4–12 though sometimes fewer, legs except coxae, trochanters and base of femora, *orange.* Wings light fuscous, veins brown. Length 14–16 mm., length of fore wing 10·5–11·5 mm., hamuli 18–24.

Altogether very similar indeed to the male, the peculiarly modified clypeus, for example, except in its greater width in the female, being virtually identical in the two sexes. The chief secondary sexual structural differences are the following: eyes somewhat smaller, further apart, interocular distance at level of sockets twice length of scape (without radicle); antennal scape less curved and less robust, segment 3 shorter, only half as long as scape (without radicle), 4–10 progressively wider, 10 about 1½ times as wide as long, 11–12 a little narrower; fore trochanter simple.

From the specimens examined it appears that in both sexes the longer spur of the hind tibia is not originally simple but may become so by the loss or wearing away of the fine spines situated near the tip of the spur. While the trifid condition is common, there is a specimen with a 4-spined spur and others with all graduations to the simple condition.

Specimens examined: Cape Province: Clanwilliam, Nardouw, ix. 1941, 11 ♂♂, 2 ♀♀ (S.A.M. Staff); Het Kruis, x. 1947, 7 ♂♂ (S.A.M. Staff); Citrusdal Dist., xi. 1948, 5 ♀♀ (S.A.M. Staff); 4 miles S. of Clanwilliam, ix. 1961, ♀ (S.A.M. Staff).

Ceramius richardsi sp. n.

Ceramius peringueyi (*non* Brauns) Richards, 1962: 100 [*partim*, ♂ only].

The ♂ of this new species, which has been adequately described by Richards, was unfortunately assigned by him to *peringueyi* Brauns to which species it most certainly does not belong. This misidentification was made obvious by the discovery in the collection of the South African Museum of a hitherto undescribed ♀ which closely matches Richards' ♂ in all important characters such as the unusual form of the clypeus. That this latter character is of value in associating the sexes is demonstrated by the discovery, also in the South African Museum collection, of the hitherto undescribed ♀ of *clypeatus* Richards, a closely related species, the ♂ of which was used by Richards as a comparison in describing what he thought was the ♂ of *peringueyi* Brauns. In *clypeatus* Richards the form of the clypeus is common to both sexes. I have pleasure in naming the ♂ under consideration and the here described matching ♀ after the author, Professor Richards. The true ♂ of *peringueyi* Brauns is thus still unknown.

♀. Black; spot on mandibles near base, large discal spot on clypeus, inner orbits to top of ocular sinus, streak at top of tempora, two widely separated streaks on hind margin of pronotum, dot at apex of scutellum, moderately large spot on prepectus, small anterior spots at base of fore tibiae and end of mid femora, narrow lateral spots on gastral tergites 1–5 (tergite 6 hidden) produced inwards and forming narrow incomplete bands on tergites 2–3 and centrally widened ones on 4–5, *creamy-white*.

Antennal segments 4–12 beneath, portions of mandibles, anterior vertical portion of clypeus beneath disk, whole of legs except coxae of all legs and trochanters and bases of femora on mid and hind legs, *reddish*.

Wings fuscous, venation dark brown.

Length 15 mm., length of fore wing 10 mm., hamuli 21.

Head, thorax and gaster with long, rather dense, whitish hairs. Mandibles strongly striate distally, ending in two large blunt teeth with a smaller more dorsal one. Clypeus elongate, strongly raised, anteriorly falling at right angles towards ventral margin; length of vertical part $\frac{3}{5}$ length of disk; from just below point of inflection two small curved teeth project upwards; ventral

margin produced, somewhat lamellate, truncate and slightly emarginate; disk narrower at apex than at base; anterior-lateral margins raised and slightly lamellate. Antennal sockets separated by $3\frac{1}{2}$ times their diameter; interocular distance at level of sockets twice the length of scape (without radicle); total length of scape $3\frac{1}{2}$ times greatest width (at apex); segment 2 very short, 3 slightly shorter than 4+5+6, 4–12 all of about same length, 4–10 becoming gradually and progressively wider, 11 slightly narrower than 10, 12 narrower still, rounded at apex. Disk of clypeus and small, roughly triangular area above it and between antennal sockets almost smooth; frons punctured; posterior ocelli a little in front of hind margin of eyes; distance between eye and posterior ocellus: distance between posterior ocelli = 10 : 7; occiput behind eye somewhat wider than interocellar distance; occipital keel present.

Thorax with fairly coarse, separated punctures, the interstices shining, about as wide or wider than the punctures. Mesoscutum shining; prescutal furrows deep over their entire length, especially so behind. Raised disk of scutellum with rounded edges and without a central keel.

Metanotum with a central prominence, lateral depressions fairly deep but open. Tegula smooth and shining, only the base punctured. Propodeum with fairly long blunt spines; posterior surface almost flat; spiracle with anterior margin strongly produced backwards. Fore tibial spur regularly curved, tip somewhat recurved. Mid and hind tibiae with two spurs, longer spur of hind tibia simple. Inner keel of hind coxa present on proximal half only. Claws simple. Gaster shining; tergite 1 constricted posteriorly, more finely punctured than thorax; tergites 2–6 becoming progressively finer punctured, 2 somewhat contracted at base.

Specimens examined: Cape Province: Clanwilliam, ix. 1928 (Dr. Brauns), Holotype ♂ (Transvaal Museum, Pretoria); Paleisheuwel, xi. 1948 (S.A.M. Staff), Allotype ♀ (S.A.M.).

The female has ten mites present on the axillae and lateral depressions of the metanotum.

Ceramius nigripennis de Saussure

Ceramius (*Paraceramius*) *nigripennis* de Saussure, 1854: pl. 3, fig. 4, ♀; 1855: 69.
Ceramius nigripennis de Saussure, Richards, 1962: 100.
Ceramius hessei Turner, 1935: 296, ♂, ♀.
[*non*] *Ceramuis nigripennis* of other authors.

Specimens examined: Namaqualand: Kamieskroon, ix. 1930, ♂ holotype, ♀ allotype of *C. hessei* Turner, 24 ♀♀ (S.A.M. Staff); between Kamieskroon and Springbok, x. 1939, ♂, ♀ (S.A.M. Staff); Bowesdorp, xi. 1931, ♂, ix. 1941, 2 ♂♂ (S.A.M. Staff); Outiep, Garies, ix. 1953, ♂ (J. du Toit).

Ceramius toriger von Schulthess

Ceramius toriger von Schulthess, 1935: 383, ♀; Richards, 1962: 101.

Specimens examined: Cape Province: Augusfontein, Calvinia, ix. 1947, 19 ♀♀ (S.A.M. Staff); Tankwa Karoo, Waterval, xi. 1952, 10 ♀♀ (S.A.M. Staff); 5 miles N. of Nieuwoudtville, ix. 1961, 2 ♀♀ (S.A.M. Staff).

A single female from Namaqualand: Knersvlakte, x. 1950 (S.A.M. Staff), differs from the description of this species and from the above listed specimens in that the light coloured markings are more extensive and are yellow, not ivory. Structurally there are no differences. The distribution of the yellow markings is given below.

Black; large spots on basal half of mandibles, clypeus (except for oblique black streaks arising from bottom of antennal sockets, infuscation between ends of these streaks and lateral margins, and ferruginous lateral and apical margins), a large pentagonal spot enclosing a black triangle on frons above clypeus, inner orbits to centre of ocular sinus, spots behind eyes, uninterrupted pronotal band extending onto sides, large spots on mesopleura, sides of mesonotum next to tegulae, a small median spot in posterior region of mesoscutum, posterior quarter of scutellum and centre of metathorax, streaks on axillae, whole of propodeum behind level of spiracles, broad apical bands widened laterally on tergites 1–5, tergite 6 except for depressed area, whole of sternite 2, wide apical bands on sternites 3 and 4, portions of femora and tibiae, *yellow*.

In addition, the antennae are much lighter in colour, the scape being largely yellow.

Ceramius braunsi Turner

Ceramius braunsi Turner, 1935: 294, ♂, ♀; Richards, 1962: 101.

Specimens examined: Cape Province: Olifants River, between Citrusdal and Clanwilliam, x–xi. 1931, ♂ holotype, ♀ allotype, 3 ♂♂, 32 ♀♀ (S.A.M. Staff); Pakhuis Pass, Clanwilliam, ix. 1942, ♀ (S.A.M. Staff); 4 miles S. of Clanwilliam, ix. 1961, 2 ♂♂, 2 ♀♀ (S.A.M. Staff).

Ceramius jacoti Richards

Ceramius jacoti Richards, 1962: 101, ♂, ♀.
Ceramius nigripennis (*non* de Saussure) Brauns, 1913: 201, pl. 2, fig. 3, ♂.

Specimens examined: Cape Province: Hex River, i. 1884, ♀; Oudtshoorn, Zebra, x. 1951, 17 ♀♀ (S.A.M. Staff); Ouberg Pass, S.E. of Touws River, xii. 1962, ♀ (S.A.M. Staff); Verkeerde Vlei, Touws River–Hottentots Kloof, xii. 1962, 11 ♀♀ (S.A.M. Staff); Constable, xii. 1962, ♀ (S.A.M. Staff); Touws River–Ouberg Pass, xii. 1962, ♀ (S.A.M. Staff); 8 miles N.E. of Touws River, xii. 1962, ♀ (S.A.M. Staff); Bloutoring Station, 30 miles E. of Touws River, xii. 1962, 98 ♀♀ (S.A.M. Staff).

Ceramius beyeri Brauns

Ceramius beyeri Brauns, 1903: 69, ♂, ♀; Richards, 1962: 102, figs. 105–9.

Specimens examined: Cape Province: Willowmore, no date, ♀ cotype, 2 ♀♀ (Dr. Brauns); Somerset East, 25–30. xi. 1930, ♂, ♀ (R.E. Turner); Nieuveld

Escarpment, Rietvlei, i. 1949, ♀ (S.A.M. Staff); Tankwa Karroo, Renoster River, xi. 1952, 116 ♀♀ (S.A.M. Staff); Constable, xii. 1962, 3 ♀♀ (S.A.M. Staff); Matroosberg Station, xii. 1962, ♀ (S.A.M. Staff); Touws River–Hondewater (18 miles E. of Touws River), xii. 1962, 2 ♀♀ (S.A.M. Staff); Bloutoring Station, 30 miles E. of Touws River, xii. 1962, 2 ♀♀ (S.A.M. Staff).

Ceramius damarinus Turner

Ceramius damarinus Turner, 1935: 293, ♂, ♀; Richards, 1962: 102.

Specimens examined: S.W. Africa: Ongandjera, iii. 1923, type ♂, 2 ♂♂ cotypes, ♂, type ♀ (S.A.M. Staff); Kamanyab, iii. 1925, 2 ♂♂ (S.A.M. Staff).

Ceramius lichtensteinii (Klug)

Gnatho lichtensteinii Klug, 1810: 36, 38, pl. 1, fig. 3, e and f.
Ceramius lichtensteinii (Klug), Klug, 1824: 225; de Saussure, 1855: 73, ♀; Brauns, 1913: 193; Bequaert, 1928: 145; Richards, 1962: 102.
Ceramius macrocephalus de Saussure, 1854: pl. 3, fig. 2, ♀; Brauns, 1903: 65, 68, ♂, ♀.
Ceramius rufomaculatus Cameron, 1906: 325, ♀.
[*non*] *?Ceramius rex* de Saussure, Richards, 1962: 102.

Specimens examined: Cape Province: Willowmore, 15. xii. 1899, ♂, 10. i. 1900, ♀ (Dr. H. Brauns); Dunbrody, 1900, ♂, ♀ (Rev. O'Neil), 1901, ♀ (J. A. O'Neil); Uitenhage, Dunbrody, no date, ♀ (Rev. O'Neil); Pearston, 1905, 2 ♀♀ (Dr. Broom); Aberdeen, xi. 1935, ♀ (S.A.M. Staff); Tankwa Karroo, Waterval, xi. 1952, 21 ♂♂, 9 ♀♀ (S.A.M. Staff); Bloutoring Station, 30 miles E. of Touws River, xii. 1962, 2 ♀♀ (S.A.M. Staff).

South West Africa: Damaraland, 1890, ♀ (R. Lightfoot). It is very doubtful whether this last record is correct.

Ceramius caffer de Saussure

Ceramius caffer de Saussure, 1855: 76, ♀; Richards, 1962: 104, figs. 110–113, 115, ♂, ♀.
Ceramius consobrinus de Saussure, 1855: 77, ♀; Brauns, 1913: 198, ♂, ♀.

Specimens examined: Cape Province: Stellenbosch, x. 1888, 3 ♂♂, 2 ♀♀, no date, ♀ (L. Peringuey), 1908, 26 ♀♀ (C. P. Lounsbury).

All the specimens carry mites in the acarinarium.

Ceramius metanotalis Richards

Ceramius metanotalis Richards, 1962: 106, fig. 114, ♀.

♂. Black; whole disk of mandibles, labrum, clypeus except very narrow margins, roughly rectangular area above and between antennal sockets (separated from clypeus by a narrow black line at suture and produced slightly upwards at inner margins of antennal sockets and with a small black tubercle at centre), narrow orbits up to centre of eye emargination, small occipital spots behind upper portion of eyes, underside of antennal scape, underside of 2nd

segment and basal two thirds of 3rd segment, pronotal band (narrowly interrupted at centre and produced on to humerus and to tegula), a minute spot on postero-lateral corner of mesoscutum and inner corner of axilla, sometimes a small spot at tip of scutellum, sometimes a very narrow streak on lower part of axilla, a spot at angles of propodeum, a single dorsal spot on mesopleuron, legs (except dorsal portions of coxae and trochanters, hind surface of middle and hind femora and tips of tarsal segments 3, 4 and 5 of above legs), inner margin of tegula, distal part of humeral plate, large spot on each side of first gastral tergite (not or only narrowly joined at hind margin), bands on tergites 2–5 (strongly widened at sides and plano-convex medially at hind margins), posterior portion of tergite 6 and small spot at sides of tergite 7, almost all of sternites 2–5 and sides of sternites 6 and sometimes 7, *pale yellow*.

Antennal flagellum except some black dorsal suffusion on all segments bar the last, *ferruginous*. Wings faintly brownish, veins brown. Length 17, 18, 19 mm., length of fore wing 12, 13, 13 mm., hamuli (20, 21), 22 (20, 22).

The chief secondary sexual structural differences are the following: Sides of clypeus more converging ventrally; margin narrower and very slightly concave. Eyes larger, a lot closer together; interocular distance at level of sockets = 1·5 times length of scape (without radicle) (2·2 in ♀). Antennal scape strongly widened, curved as in ♀; segment 3 flattened in side view, narrow except at apex, a little shorter than scape (without radicle) and slightly longer than 4+5+6; 4–11 becoming progressively wider; 12 forming a powerful, long, flattened and fairly wide hook, curved at base and at apex; inner surface of hook with a low, off-central, longitudinal carina on distal half; 8–10 with a shining, slightly raised transverse swelling beneath; entire underside of 11 swollen and shining. Fore trochanter with a very large, crescentic lobe, curving outwards, outer edge transparent, somewhat sinuate. Segment 1 of mid tarsus longer, curved; 2–5 strikingly laterally compressed, wide in side view; 3 and 4 almost oval in outline. Gaster with tergite 7 elongate, apically with a wide, shallow, angular emargination; sternite 3 with disk transversely swollen, raised on each side into a mound ending in a blunt tubercle, without raised preapical lateral keels; sternite 4 unmodified in structure; disks of both sternites 3 and 4 covered with dense white pubescence; sternites 7 and 8 very similar to those of *caffer* de Saussure; prominence on 7 more pronounced.

Specimens examined: Cape Province: Bulhoek, Klaver–Clanwilliam, x. 1950, 3 ♂♂, 27 ♀♀ (S.A.M. Staff).

Six of the 27 females have mites in the acarinium. The three males are free of mites, however.

Ceramius rex de Saussure

Ceramius rex de Saussure, 1855: 75, ♀; Turner, 1935: 290.
Ceramius lichtensteinii (*non* Klug), Richards, 1962: 102.

A single female specimen from Namaqualand: Klipvlei, Garies, xi. 1931 (S.A.M. Staff), believed to be this species, bears the label '*Ceramius rex* Sauss. ♀,

det. Turner'. Concerning this specimen, Turner (1935: 290–1) correctly stated that it corresponds to the description of *rex* de Saussure, but measures only 19 mm., not 24. His further statement that it is allied to *lichtensteinii* (Klug) is incorrect for the specimen is entirely different from the latter species, being allied to *caffer* de Saussure and *metanotalis* Richards, though distinct from both of these. Richards (1962: 102) treated *rex* de Saussure as a doubtful synonym of *lichtensteinii* (Klug) but did not see the specimen now under consideration which appears to be the true *rex* de Saussure. The following is a description of this specimen.

♀. Black; clypeus, a large, broad pentagonal spot between the antennae and above the clypeus (from which it is separated by a narrow black line at suture), a narrow streak on inner margins of eyes below, streak in ocular sinus, spot on mandibles near base, underside of scape, spots behind eyes (joined along occipital margin), pronotal band produced onto humerus and to tegula (leaving a triangular black area on side), spot at postero-lateral corner of mesoscutum, inner corner and streak on lower part of axilla, posterior part of scutellar disk and flap of posttegula, central area of metanotum and portion below acarinarium, whole of propodeum (except for black region anterior to spiracles on sides, black lateral streaks on posterior surface near junction with metanotum and two black marks just above oriface), a large spot on mesopleuron, spots on anterior surface of coxae 2 and 3, portions of trochanters, greater part of femora and tibiae of all legs, inner margin of tegula, wide posterior bands widening on sides on gastral tergites 1–5, almost whole disk of 6, two small streaks on posterior area of sternite 1, whole of sternites 2–5 except extreme base of 2, *pale yellow*.

Anterior margin of clypeus, distal half of mandibles, antennal flagellum (except some black dorsal suffusion), some suffusion on tibiae and entire tarsi, suffusion on gastral sternite 6, *ferruginous*. Wings faintly brownish, veins brown.

Length 19 mm., length of fore wing 13·8 mm., hamuli 23.

Head, thorax and base of first gastral segment with long whitish hairs, densest on head, dense on pleura, sides and angles of propodeum; rest of gaster with very fine tomentum-like pubescence.

Clypeus one third longer than wide at ventral margin, moderately coarsely punctured; ventral margin truncate, sharply angled, with a fairly wide, smooth border. Antennal sockets separated by 4·1 times their diameter; interocular distance at level of sockets twice the length of scape (without radicle); scape (without radicle) almost 3 times as long as greatest width; segment 2 very short, broader than long; 3 half as long as scape (without radicle), twice as long as greatest width, of same length as 4+5+6; 4–10 progressively wider; 10 about twice as wide as long; 11 and 12 a little narrower. Frons dull, finely punctured; POL : OOL = 1 : 1·7; posterior ocelli about half ocellar diameter in front of hind margin of eyes; occipital keel absent. Pronotum with spiracular lobe well defined by a furrow; lateral furrow partially obscured by legs, apparently rather weak; anterior margin apparently not markedly keel-like; dorsal surface

finely and closely punctured. Mesoscutum dull, finely, confluently punctured; prescutal furrows well marked over their entire length, especially behind; parapsidal furrows fairly weak; median notal suture marked anteriorly by a smooth, shining, unpunctured line, posteriorly marked by a furrow. Suture between axilla and scutellum with a pit ventrally. Raised disk of scutellum convex, in profile smoothly arcuate to posterior margin, with a well marked, raised, median keel and moderate lateral keels posteriorly, dull, punctured like mesoscutum; lateral declivities more shining, feebly punctured. Metanotum with central prominence smooth; acarinaria present laterally; entrance to acarinarium large, larger than that of *caffer* de Saussure, about 4 times longer than wide, width nearly constant throughout, only very slightly wider laterally; part of metanotum in front of slit of about same width as latter. Mesopleuron dull, with very close microscopic punctures and sparse coarse ones. Metapleuron dull, with similar but less pronounced puncturation and with some microscopic transverse striae on dorsal half; as in *metanotalis* Richards with a marked bean-shaped depression dorsally in the posterior boundary. Propodeum with angles rounded; posterior surface shallowly concave; spiracle long and narrow with anterior margin produced backwards. Fore tibial spur regularly curved, slightly recurved at apex; mid tibia with two spurs; larger spur of hind tibia bifid. Claws with a small tooth. Gaster dull, with exceedingly minute and close punctures, smaller than those of *metanotalis* Richards, and with very fine tomentum; larger punctures completely absent from all tergites; tergite 1 very transverse, nearly $3\frac{1}{2}$ times wider than long, a little constricted posteriorly, with a hyaline border; tergite 2 constricted anteriorly, maximum width $1\frac{1}{4}$ times greater than maximum width of tergite 1; tergite 3 of equal width anteriorly as tergite 2 posteriorly; tergites 3–6 becoming progressively narrower; sternites nearly flat, very closely and finely punctured.

Four mites are visible in the acarinaria.

Ceramius bicolor (Thunberg)

Philanthus bicolor Thunberg, 1815: 131, 289 [♂].
Ceramius karooensis Brauns, 1902: 282, ♀, 373, ♂.
Ceramius bicolor (Thunberg), Schulz, 1912: 68–69, 99; Bequaert, 1929: 79; Richards, 1962: 115, figs. 131, 132.

Specimens examined: Cape Province: Aberdeen, xi. 1935, 3 ♂♂, 8 ♀♀ (S.A.M. Staff); Murraysburg Dist., xi. 1935, 6 ♂♂, 2 ♀♀ (S.A.M. Staff); Augusfontein (Calvinia), ix. 1947, ♂, 2 ♀♀ (S.A.M. Staff); Oudtshoorn, Zebra, x. 1951, ♂ (S.A.M. Staff); Moordenaars Karoo, Lammerfontein, x. 1952, 3 ♀♀ (S.A.M. Staff); Willowmore–Vondeling, x. 1952, ♀ (S.A.M. Staff); Rooinek Pass, x. 1952, ♂ (S.A.M. Staff); Tankwa Karoo, Waterval, xi. 1952, 25 ♂♂, 85 ♀♀ (S.A.M. Staff); Touws River–Hondewater (18 miles E. of Touws River), xii. 1962, 5 ♂♂, 5 ♀♀ (S.A.M. Staff); Bloutoring Station (30 miles E. of Touws River), xii. 1962, 9 ♀♀ (S.A.M. Staff).

Ceramius linearis Klug

Ceramius linearis Klug, 1824: 227, ♂; Richards, 1962: 115, figs. 128–130, 113 (*b*).
Ceramius (*Paraceramius*) *linearis* de Saussure, 1855: 71, ♂.
Ceramius fumipennis Brauns, 1902: 275, ♂, ♀; Bradley, 1922: 397 (correction of Brauns).

Specimens examined: Cape Province: Algoa Bay, 25. xii. 1898, ♂, ♀ (Dr. H. Brauns); Dunbrody, 1900, ♀ (Rev. O'Neil); Aberdeen, xi. 1935, ♀ (S.A.M. Staff).

Ceramius capicola Brauns

Ceramius capicola Brauns, 1902: 278, ♂, ♀; Bradley, 1922: 397; Richards, 1962: 117.

Specimens examined: Cape Province: Willowmore, 1. x. 1899, ♀ (Dr. H. Brauns); Somerset East, 25–30. xi. 1930, 2 ♀♀, ♂ (R. E. Turner); Aberdeen, xi. 1935, 7 ♂♂, 3 ♀♀ (S.A.M. Staff); Murraysburg Dist., xi. 1935, 5 ♂♂, 11 ♀♀ (S.A.M. Staff); Teekloof, Fraserburg Dist., xi. 1935, 5 ♂♂, ♀ (S.A.M. Staff); Oukloof, Fraserburg Road, xi. 1936, 2 ♀♀ (S.A.M. Staff); Richmond Dist., xi. 1939, ♂ (S.A.M. Staff); Oudtshoorn, Zebra, x. 1951, 5 ♂♂, ♀ (S.A.M. Staff).

Ceramius socius Turner

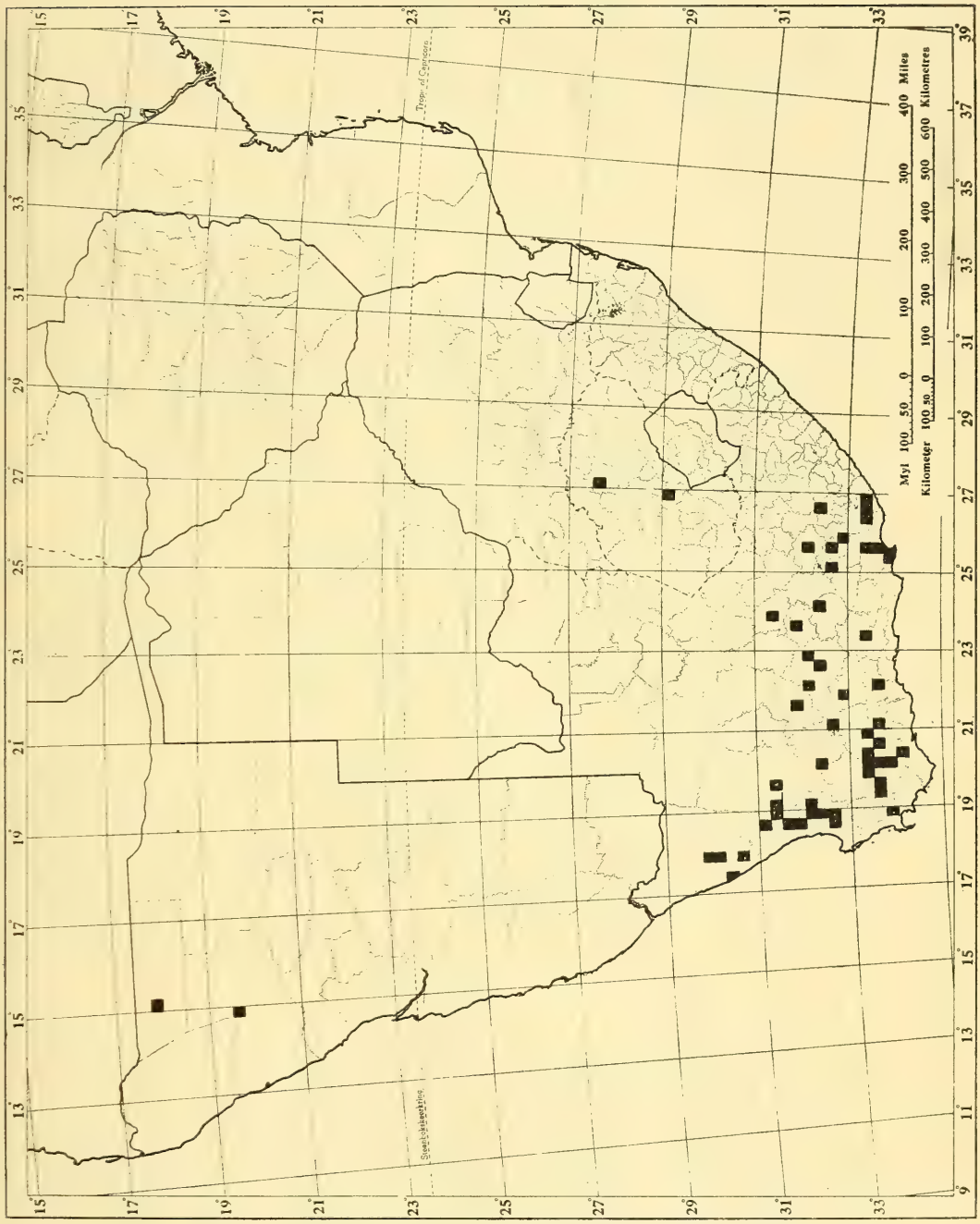
Ceramius socius Turner, 1935: 297, ♂, ♀; Richards, 1962: 117, figs. 113 (*a*), 134–136.

Specimens examined: Cape Province: Montagu, x–xi. 1919, ♀ (Collector's name not recorded); Worcester, ix. 1921, 2 ♂♂, 2 ♀♀ (R. E. Turner); Verkeerde Vlei (Touws River–Hottentots Kloof), xii. 1962, ♂, 13 ♀♀ (S.A.M. Staff); Constable, xii. 1962, 3 ♀♀ (S.A.M. Staff); Matroosberg Station, xii. 1962, ♂, ♀ (S.A.M. Staff); 8 miles N.E. of Touws River, xii. 1962, ♀ (S.A.M. Staff).

Discussion of the Distribution of the Genus *Ceramius*

The genus *Ceramius* occurs in two widely separated geographical regions in the Old World, one being the extreme south-west of the Ethiopian Region and the other that portion of the Palaearctic bordering on the Mediterranean Sea. Thus, in the Ethiopan Region, the genus is in the main restricted to the Cape Province where it is found in Little Namaqualand, the South Western Cape, the Little Karroo and the southern parts of the Great Karroo. It does not extend further east than the Great Fish River. Outside the Cape Province, one species (*damarinus* Turner) is endemic to South West Africa (Kaokoveld and Ovamboland), and one Eastern Cape species (*capicola* Brauns) has been recorded from two localities (Kroonstad and Thaba Nchu) in the Orange Free State. This distribution has been plotted by means of a $\frac{1}{4}^{\circ}$ square grid system on an outline plotting map (Map 1). In the Palaearctic, the genus occurs in Algeria, Morocco, Gibraltar, Portugal, Spain, the south of France, Greece, Turkey, Russian Armenia and probably Israel.

Climatically the above areas are characterised by a predominantly winter rainfall while the vegetation is generally low and semi-desert in nature.



MAP 1. Distribution of the genus *Ceramius* in the Ethiopian Region.

In South Africa, *Ceramius* favours those parts of the Karroid and False Karroid areas (as defined by Acocks, 1953) which lie within the winter rainfall region, though two of the nineteen species, *damarinus* Turner and *capicola* Brauns, have been recorded from summer rainfall regions.

A study of the records shows that in the southern hemisphere no species flies earlier than September or later than March, while in the northern hemisphere no species flies earlier than March or later than August. In other words, flight is restricted to the dry spring and summer months succeeding the winter rainy season.

Having ascertained where and when *Ceramius* occurs it seems of interest to examine the reasons. In this connection the biology of the genus has to be taken into account. As stated above, the adults fly during the dry months of the year succeeding the winter rainy season. During this time mating takes place and burrows lined with mud pellets are built in the ground and surmounted by mud chimneys. In these the eggs are deposited and, in the South African species at least, it is recorded by Brauns (1910, cited by Richards, 1962: 29) that the female continues to provision the young with pollen and nectar until these larvae are ready to pupate, when she seals the opening to the nest with a plug of mud. There is only one generation per year.

Two requirements for the successful run of the life-history are immediately apparent: there must be a copious supply of pollen and nectar at the time the young are being reared and there must be an extended dry period, not only to allow the adult to collect this pollen and nectar but also on account of the fact that the burrows in the ground remain unplugged during the larval stage. Despite some possible protection afforded by the chimneys, the larvae would have little chance of survival in case of heavy rain.

The combination of winter rainfall followed by an abundance of suitable flowers rich in pollen and nectar during an extended dry period is obviously the clue to the distribution of the genus *Ceramius*. The only areas fulfilling these requirements are those in which *Ceramius* occurs. In this connection it is likely that the flowers visited by *Ceramius* will prove to be low-growing Compositae and mesembryanthemums (Aizoaceae) which, following the winter rains, are such a striking feature of the semi-desert areas inhabited by *Ceramius* in South Africa.

Summary

The account of the South African species of *Ceramius* included in the revision of the Masaridae by Richards (1962) is supplemented by the study of the material in the South African Museum collection.

One new species, *richardsi*, and the hitherto unknown ♀ of *clypeatus* Richards and ♂ of *metanotalis* Richards are described as is also a specimen thought to be *rex* de Saussure. The locality records of all the specimens in the collection are given and the distribution of the genus in South Africa is mapped. Lastly the distribution of the genus as a whole is discussed with reference to the biology of these wasps.

Acknowledgements

I wish to thank Dr. G. van Son of the Transvaal Museum, Pretoria for the loan of type material of *peringueyi* Brauns, *clypeatus* Richards and *metanotalis* Richards. The Trustees of the South African Museum are grateful to the Council for Scientific and Industrial Research for a grant to publish this paper.

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SYNONYMY

Arranged according to chronology of names. Published scientific names by which a species has been previously designated (subsequent to 1758) are listed in chronological order, with abbreviated bibliographic references to descriptions or citations following in chronological order after each name. Full references must be given at the end of the paper. Articles and recommendations of the *International code of zoological nomenclature adopted by the XV International congress of zoology, London, July* 1958, are to be observed (particularly articles 22 and 51).

Examples: *Plonia capensis* Smith, 1954: 86, pl. 27, fig. 3. Green, 1955: 23, fig. 2.

When transferred to another genus:
Euplonia capensis (Smith) Brown, 1955: 259.
When misidentified as another species:
Plonia natalensis (*non* West), Jones, 1956: 18.
When another species has been called by the same name:
[*non*] *Plonia capensis*: Jones, 1957: 27 (= *natalensis* West).

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